NATIONAL FIBER

CEL-PAK INSULATION

Professional Cellulose for Cellulose Professionals

Q.: What is Cel-Pak?

A.: *Cel-Pak is a premium quality cellulose insulation.*

Q.: Who makes Cel-Pak?

A.: *Cel-Pak is manufactured by* ***National Fiber*** *of Belchertown, MA.*

Q.: What is Cel-Pak made from?

A.: *Cel-Pak is made primarily from over-issue newsprint, along with other high-quality over-issue paper sources, and carefully selected post-consumer newsprint, typically from paper drives. As just one example, if a New England newspaper printed 1,000,000 copies yesterday, but only sold 750,000, National Fiber buys the remaining 250,000 in bulk and turns them into insulation.*

Q.: So that's it? Cel-Pak is insulation made out of newspapers?

A.: *There's a little more to it than that. ☺ The newspaper is first reduced to very small pieces in a machine called a hammermill, pieces just big enough to make out one letter from the original newspaper. In the next step, these tiny pieces are 'fiberized', that is, they go through another process that breaks them down to the component fibers of the original tree from which the newsprint was made. At this point, there's no resemblance to the original newspaper. Then a borate, a naturally occurring mineral, is added for fire, mold and pest control. Lastly, there is a tiny amount of mineral oil added, for dust control. The product is then bagged in 25 lb. bags.*

Q.: What makes Cel-Pak 'premium quality'?

A.: *National Fiber works hard to ensure that our Cel-Pak cellulose insulation is the highest-grade cellulose insulation product available. We actually hand sort the paper going into our product to remove metal bands, twine, glossy or coated stock (like coupons) - anything that shouldn't be in your walls. We also don't use mixed, post-consumer recycled material, which means that the product is dry and doesn't contain pieces of plastic bags, cans, or bits of somebody's leftover foodstuffs. What's the benefit?*

For Homeowners

- *Clean, sanitary product*
- *Consistent fire retardant*

For Installers

- *No trash to clog your machine*
- *You're not paying for plastic & metal*

absorption

- *No non-insulating materials*
- *Premium quality*

trash

- *Predictable coverage rates*
- *Less wear and tear on machine seals*
- *Less downtime & machine maintenance*

Q.: Won't cellulose make my house more likely to burn down if I have a fire?

A.: *No, in fact just the opposite. The borate (a naturally occurring mineral) added to the cellulose fiber ensures that cellulose insulation won't support combustion. In fact, here's a picture of what happens when cellulose is exposed to flame, in this case from a torch.*

*The very top layer of the insulation chars instantly, and that char protects everything underneath it, including the hands of our initially reluctant designer, John, who 'volunteered' for this picture at the photo shoot. (There's no trick involved in the photo, but we do not recommend you try this at home. And you should **never**, under any circumstance, try this with fiberglass or foam based insulations - you'll get **badly** burnt.*

The simple fact of the matter is that cellulose will perform better and provide better protection in the event of a fire than either fiberglass or sprayed foams (despite the fact that, when properly installed, all three have a Class A fire rating).

Q.: My neighbor's house, insulated with cellulose in the '80's, had settling problems. Will Cel-Pak settle?

A.: *You're not going to have that problem with Cel-Pak, because there have been two significant changes since the 'old days' of cellulose insulation.*

First, the way the product is manufactured. Today's product is fiberized, which allows for increased coverage and lower settled densities.

Second, the machines and techniques to install the product have been greatly

upgraded. It may sound like a simple job, but it requires a technically sophisticated, truck or trailer-mounted machine to properly install Cel-Pak. It also takes specialty training to learn how to correctly install Cel-Pak.

So with today's equipment and techniques, Cel-Pak is 'dense packed' in the walls of your building at twice its settled density. In simple terms, that means that the wall or ceiling cavity is filled and is actually under slight pressure from the material. It can't settle because there is no space left for it to settle into.

That covers dense pack cellulose installed in an enclosed cavity, like a wall. What about loose fill installation in your attic?

Some competitors to cellulose like to make much of the fact that loose fill cellulose, blown into an attic, settles, and therefore 'loses R-Value', or the consumer 'receives an R-Value less than what they paid for.' We're here to tell you, that's nonsense.

Your installer knows precisely how much loose fill cellulose will settle. They're equipped with a table that tells them how much cellulose to install to achieve the desired R-Value, as measured after the cellulose achieves its settled density.

So the plain truth is, the consumer always gets the R-Value they pay for, because the cellulose is installed to deliver that R-Value.

Q.: I'm a handy person. Can I install Cel-Pak myself?

***A.:** Sorry, no. It takes a very special machine and unique training. Even where Cel-Pak is used to 'cap' an attic, i.e., it is blown in loose, there's a technique to it, and you really need to know what you're doing.*

For attics only, you could rent a light-duty machine at the Home Center and install a 'homeowner grade' cellulose product, but you won't get the same result. And that home center or lumberyard rental machine simply isn't capable of dense packing a wall cavity. Save yourself the hassle and call us!

Q.: Are there other choices in insulation?

***A.:** There are basically three widely available choices in insulation products for your home: fiberglass, cellulose and sprayed foam insulation.*

Q.: Doesn't R-Value tell the whole story, i.e., 'Good R-Value equals good insulation?'

***A.:** You've hit upon perhaps the single most misunderstood idea about insulation, that R-Value tells the whole story. Not only does R-Value not tell the whole story, it barely scratches the surface.*

*R-Value is a measure of a material's thermal conduction, which is fine as far as it goes. Unfortunately, R-Value has taken hold in the consumer's mind as a universal method for comparing insulations - the higher the R-Value, the better the insulation, end of story. But all **R-Values are not created equal**, because they measure only one of the factors that determine how an insulation product will perform in the real world.*

Insulation is, first and foremost, meant to stop the movement of heat. The problem with using R-Value as the sole yardstick of an insulation's effectiveness is that heat moves in and out of your home or office in four ways: by conduction (which R-Value measures), and by convection, radiation and air infiltration (which R-Value doesn't measure). But let's stick with the concept of R-Value for the moment. The R-Values' of insulation materials are measured in a lab. That would work great - if your home was inside a lab! But your home was built outdoors, and that means there are other factors like wind, humidity and temperature changes in play. These factors create pressure differences between the interior and the exterior of the building due to things like hot air rising, air pressure, and mechanical systems forcing air through every tiny little opening and making its way to the interior.

Your home or commercial building may look solid, but there are thousands of tiny gaps, cracks and penetrations between building materials. For example, when we apply the air pressure of a 20 MPH wind on a 20 deg. F day to a building, the typical R-19, fiberglass insulated wall often performs no better than the wood studs (R-6) - because of air infiltration, with heat being transported around (bypassing) the fiberglass batts through convection. In very low density materials like loose blown fiberglass, heat will actually radiate right through the insulation, and this, along with convection, significantly reduces fiberglass' installed performance and your comfort.

A superior insulation system will have good R-Value (prevent heat loss via conduction), will be pneumatically or spray applied, fully filling the building cavity (prevent heat loss via convection), and will be densely packed (prevent heat loss via air infiltration and radiation). Fiberglass meets the first criteria, but not the other three. ***Cellulose meets all four of these critical performance criteria!*** *In addition, you want your insulation to do more than just insulate. Besides insulating, cellulose can help prevent the spread of flames in the event of a fire, deters mold and pests and blocks the transmission of sound much more effectively than fiberglass. The insulation in your walls, ceilings, attic, etc., has a lot of jobs to do besides insulating - and cellulose is up to all those jobs! Don't choose your insulation because some brightly colored cartoon cat with a catchy theme song says it's good. Choose it because it can do all the things you need your insulation to do!*

Q.: But which one costs the least? I'm on a budget!

A.: *First, we have to define our terms. If you're talking about price at the time of installation, well, that would be glass fiber, followed by cellulose, then comes foam. But cost isn't the same as price.* ***Price*** *is what you pay at the time of installation.* ***Cost = Price plus the cost of ownership over time****. (The 'cost of ownership' when it comes to your insulation choice is what you spend on energy to heat and cool your home.) In that equation, cellulose wins by a mile. Here's why:*

If you simply compare the published R-Values, cellulose and glass fiber are very comparable. But R-Value only measures thermal resistance, i.e., how well insulation resists conducting heat energy.

It doesn't measure resistance to air infiltration, and cellulose does a much better job of stopping air infiltration than glass fiber. The University of Colorado School of

Architecture and Planning did a study on Fiber Glass vs. Cellulose Installed Performance. They constructed two identical structures, insulating one with glass fiber, the other with cellulose. The cellulose structure was 38% tighter.

Thinking of insulating your attic, or adding to the insulation already in place? In a study done by Oak Ridge National Labs, the air permeability of loose fill cellulose at 2 lbs./cubic foot was found to be:

• 10 - 33 times better than blown fiberglass, depending upon the density of the fiberglass
• 3+ times better than standard fiberglass batts
• 2 times better than high-density fiberglass batts

This has huge significance for your home's energy consumption, in both heating and cooling.

So the answer to your question is cellulose costs less to own, or saves more money, over time. (How much less? Savings vary, and every house is different.) That's before you take into account the fact that, because cellulose does such a good job at preventing air infiltration, if you're building a new home, you may very well be able to install a smaller furnace and a smaller AC unit - another savings! It's also quieter, safer in the event of a fire, and may help resist pests.

Q.: Where can I learn more about cellulose insulation?

A.: *Try* ***National Fiber's*** *website (www.nationalfiber.com) or the* ***Cellulose Insulation Manufacturer's Association*** *website (www.cellulose.org).*

Q.: What's the difference between cellulose, fiberglass and foam insulations?

A.: *There are many differences. Here's a simple chart that outlines some of them:*

National Fiber's Cellulose Insulation

How Do They Stack Up?	**Cel-Pak Cellulose**	Glass Fiber Batts	Open Cell Foam (1/2 lb. density)	Closed Cell Foam (2 lb. density)
Typical R-Value in 2x6 wall	**R-20**	R-11*	R-20**	R-21 to 34***
Resists Air Flow?	**Yes-Dense Packed √**	No - Air Filter	Yes √	Yes √
No Gaps or Voids?	**Yes-Dense Packed √**	No - Gaps & Voids	May Have Voids	**Voids if cavity not filled. Gaps or cracks can occur as structure dries or moves.**
Use for retrofit w/o sig. demolition?	**Yes √**	No	No	No
Sound Transmission (STC)	**41 √**	38^	37	37
Smoke when burned?^^	**None √**	50	300 - 400	300 - 450
Functions as Fireblock?	**Yes √**	No - Melts	No - Burns^^^	No - Burns^^^
Moisture Management	**Yes-Hygroscopic √**	No - Hydrophobic	No - Hydrophobic	No - Hydrophobic
Deters Mold & Pests	**Yes - Has Borates √**	No	No	No
Outgasses?	**No √**	May - Formaldehyde	Yes - At installation	Yes - At installation
Blowing agent?	**Air √**	n/a	H_2O/CO_2#	Chemical based gas#
Recycled Content	**82%+ √**	35-50%##	Little or None	Little or None
Embodied Energy	**750 btu/lb √**	12,000 btu/lb	up to 30,000 btu/lb	up to 48,000 btu/lb

* Per Conservation Services Group (CSG), R-19 rated glass fiber batt R performance in typical installation. ** Assumes cavity is completely filled, which may not be the case. *** In a completely filled 2x6 cavity, closed cell foam will have an R-Value of app. 34. However, field installation depth by many contractors is app. 3.5" in a 2x6 wall cavity due to cost, challenge in controlling application depth and difficulty of trimming. In addition, in partially filled cavities, thermal bridging by studs can further degrade R-Value.
^ As measured in a laboratory setting - installed performance typically lower. ^^ ASTM E 84 SDI (Smoke Developed Index)
^^^ Once code mandated fire barrier is breached. # Some blowing agents used in sprayed foams are also powerful greenhouse gases. Check with the manufacturer of your product. ## 35% according to National Resources Defense Council, 50% according to NAIMA (No. American Insulation Mfr's Asso.)
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As you can see in the chart, Cel-Pak cellulose insulation offers some distinct advantages over fiberglass and sprayed foam. Cel-Pak offers:

- *Resistance to air movement through the structure*
- *No gaps or voids*
- *The best resistance to noise transmission*
- *In the event of a fire, Cel-Pak works to help prevent it's spread*
- *The best protection from moisture, mold and pests like carpenter ants*
- *The highest recycled content, by far and*
- *The least embodied energy content*

In short, Cel-Pak cellulose insulation is the best and the 'greenest' choice you can make in insulation for most applications.

Q.: Embodied energy? What's that?

A.: *One measure of embodied energy is simply the amount of energy it takes to manufacture something. Relative to cellulose, fiberglass takes much more energy to produce[1]. For the consumer, the lower the embodied energy of a product, the less pollution generated when the product was made.*

Another approach is to look at the Global Warming Potential and Life Cycle Analysis measurements relative to energy usage. According to the University of Minnesota's Minnesota Sustainable Housing Initiative research[2], by these measures, the life cycle of fiberglass batts, compared to cellulose, features:

- ***683%*** *more energy consumption*
- ***728%*** *greater global warming potential (in lbs. of CO2)*
- ***1,850%*** *higher air pollution index*

Sprayed foams? They take far more energy to produce than fiberglass, which means they have far worse environmental effects.

If you want to save money on energy and take it easier on the environment over time, Cel-Pak cellulose is a great choice!

[1]"Life Cycle Analysis of a Residential Home in Michigan" S. Blanchard & P. Reppe (Sept. 1998); Canadian Architect Measures of Sustainability
[2]http://www.buildingmaterials.umn.edu.